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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,931	07/10/2003	Shingo Morishima	116459	9929

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EXAMINER	
KALAFUT, STEPHEN J	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/615,931	MORISHIMA ET AL.	
	Examiner	Art Unit	
	Stephen J. Kalafut	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10 July 2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto *et al.* (JP 9-231,353).

Yamamoto *et al.* disclose a fuel cell system including a fuel cell (1), which would produce energy from the reaction of H_2 and O_2; a hydrogen supply line (2), which would supply the fuel cell with H_2 from a source thereof; an off-gas recirculation line (5) extending from the fuel cell to the hydrogen supply line; and an off-gas recirculation mechanism (3), which mixes the off-gas in the recirculation line with the H_2 from the supply line. The amount of flow in the recirculation line is controlled according to the load of the fuel cell, which would be the output demand (abstract, lines 12-18). Since this is done using a "control signal", (abstract, line 11), it would involve a circuit that determines the output and a controller. The amount of gas in the recirculation line is controlled in response to a pressure gauge (10). The output of the ejector is controlled for pressure via another gauge (14). The pressure of the ejector output is controlled to a prescribed value or more (abstract, lines 15-18), which would mean that it is controlled to either a target value or a range.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto *et al.* in view of Ueda *et al.* (US 6,864,003).

This claim differs from Yamamoto *et al.* by reciting that the controller drains the off-gas recirculation line when the amount of energy produced by the fuel cell is smaller than the load demand, and when the pressure is in a target range. Ueda *et al.* disclose a fuel cell system with an off-gas recirculation line (60a) and an off-gas purge line (60b) and valve (66). The purge line is used when the pressure difference between the two electrodes needs to be adjusted (column 5. lines 25-29). This may be caused by flooding, which blocks the hydrogen passages and also reduces fuel cell output voltage (column 1, lines 17-32). Thus, the hydrogen purge may protect the fuel cell against flooding. For this reason, it would be obvious to protect the fuel cell of Yamamoto et al. by adding to its recirculation line a purge line and valve as disclosed by Ueda *et al.*, which would drain the off-gas recirculation line upon voltage output drop.

Claims 6-8 and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto *et al.* in view of Waldman (US 3,585,077).

While Yamamoto *et al.* show that their ejector pump (3) is adjustable, as seen by the dashed control lines connecting it to a flow meter (11) and a pressure gauge (10), they do not specify that the area of the nozzle is controllable. Waldman discloses an ejector (20) that allows a gas to enter via an inlet (126), and controls the amount of this gas via a movable plug (124),

which is in the form of a tapered needle. The distance from the plug to a seat (130) controls the area of the opening therebetween, and thus the flow of the gas entering from the inlet (126) into the final mixture. The position and two-way motion of the plug is also controlled by a spring (122). Because the arrangement of Waldman would be able to control the amount of one gas mixing with another, which is also the purpose of the ejector of Yamamoto *et al.*, it would be obvious to use an ejector as shown by Waldman, with its movable plug and spring, as the ejector in the system of Yamamoto *et al.*

Claims 9-11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto *et al.* in view of Grasso (US 3,982,961).

Yamamoto *et al.* do not disclose a heater to heat the off-gas recirculation mechanism. Grasso discloses an ejector in heat exchange relationship with the fuel cells with which it is used (column 2, lines 11-14). This prevents any water vapor coming into the ejector from condensing and causing problems such as flooding (column 1, lines 43-56). To prevent these problems from occurring in the system of Yamamoto *et al.*, it would be obvious to heat their ejector as taught by Grasso. Various types of heaters are known in the art.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto *et al.* in view of Merritt *et al.* (US 5,411,821).

Yamamoto *et al.* do not disclose a hydrogen supply pressure regulation device. Merritt *et al.* disclose a fuel cell with an off-gas recirculation line (146), an ejector (124) and a pressure-regulating valve (122) for the hydrogen coming from a hydrogen supply (120). Since the amount

of hydrogen needed by a fuel cell varies with the load demand, this pressure regulation of the fresh hydrogen would be beneficial, allowing the amount thereof to vary with the needs of the fuel cell. For this reason, it would be obvious to use the pressure-regulating valve of Merritt *et al.* with the supply of fresh hydrogen disclosed by Yamamoto *et al.*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Iwasaki (US 6,447,939) discloses a fuel cell that would experience large variations in its power demand, due to being used in a vehicle.

Claims 1, 3 and 13 are objected to because of the following informalities: In claims 1 (page 20, line 14) and 13 (page 23, line 21), the word "recircualting" is misspelled. In claims 3 and 13, in the last line of each, the term "target one" would read better as "target value". Appropriate correction is required.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Kalafut whose telephone number is 571-272-1286. The examiner can normally be reached on Mon-Fri 8:00 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sjk

STEPHEN KALAFUT
PRIMARY EXAMINER
GROUP 1700